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February 9, 2007

VIA ECFS

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554

Re: M2Z Networks, Inc.
Application for License and Authority to Provide National
Broadband Radio Service in the 2155-2175 MHz Band
WT Docket No. 07-16

Dear Ms. Dortch:

On behalf of M2Z Networks, Inc. ("M2Z"), attached for inclusion in the record in the above-referenced proceeding, please find comments previously submitted to the Commission on July 11, 2006 in response to a Public Notice in ET Docket No. 06-89, Creation of a Spectrum Sharing Innovation Test-Bed ("Test-Bed Comments").

M2Z's Test-Bed Comments are relevant to the review of M2Z's Application for License and Authority to Provide National Broadband Radio Service in the 2155-2175 MHz Band (the "Application") because they provide additional evidence of the public interest benefits of the Application. The Test-Bed Comments explain how the M2Z network can further the Commission's goal of evaluating innovative methods of spectrum sharing among disparate users. As the Test-Bed Comments explain, the M2Z Application proposes a network that will accommodate both commercial and public safety use. Such "same-system" sharing is one of the methodologies the Commission seeks to evaluate through its establishment of a Test-Bed. The Test-Bed Comments also explain that the M2Z network can be configured to accommodate a broad range of government uses, including uses other than public safety. M2Z's proposed network could serve as a vibrant ecosystem for a variety of methods of spectrum sharing and efficient use of finite radio spectrum. Accordingly, inclusion of the Test-Bed Comments in this proceeding will establish a more thorough record of the public interest benefits of the Application.

If you have any questions concerning this matter, please do not hesitate to contact the undersigned.

Sincerely,

/s/

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Enclosures

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**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
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Creation of a Spectrum Sharing)	
Innovation Test-Bed)	ET Docket No. 06-89
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**COMMENTS OF
M2Z NETWORKS, INC.**

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**COMMENTS OF
M2Z NETWORKS, INC.**

M2Z Networks, Inc. (“M2Z”) submits these comments concerning the spectrum test-bed proposed by the Commission and the National Telecommunications and Information Administration (“NTIA”)³ to, among other things, express its desire to work cooperatively to promote the success of the test-bed.

I. INTRODUCTION AND SUMMARY

The test-bed is designed to “seek to evaluate innovative methods for spectrum sharing among disparate users to enable more intensive use of the finite radio spectrum.”⁴ M2Z applauds that effort, and focuses its comments primarily on five of the questions raised in the Public Notice that are cornerstones of the effort: what goals the test-bed should effectuate; what particular portion(s) of the spectrum should be identified for this purpose;⁵ whether the test-bed

³ See Public Notice, Federal Communications Commission Seeks Public Comment on Creation of a Spectrum Sharing Innovation Test-bed, FCC 06-77 (rel. Jun. 8, 2006) (“Public Notice”). Simultaneous with these comments, M2Z will file a response to NTIA’s Notice of Inquiry in its President’s Spectrum Policy Initiative Spectrum Sharing Innovation Test-Bed proceeding, 71 Fed. Reg. 33282 (June 8, 2006).

⁴ Public Notice at 1.

⁵ *Id.* at 3.

should focus on “particular technologies” (such as cognitive radios and smart antennas);⁶ whether “use of proprietary technologies or information be permitted” in the test-bed;⁷ and “[w]hat metrics should be used in evaluating the results/accomplishments” of the test-bed program.⁸

As outlined below, M2Z proposes the following framework for the above-mentioned areas of inquiry:

- M2Z’s proposed system, once licensed and deployed at 2155-2175 MHz, will provide a sustainable ecosystem of advanced technologies in large scale commercial deployment for testing same-system sharing among federal and private users;
- to the extent other systems become operational in other frequency bands, these systems too can serve as platforms for exploring same-system sharing;
- several spectrum bands are suitable for exploring sharing of the same spectrum among disparate systems. Thus, the 2155-2175 MHz band should not be part of the test-bed before M2Z’s proposed system is licensed and deployed;
- the Commission and NTIA should take precautions to safeguard any proprietary information and protect system operators from liability towards third parties; and
- the goals of testing same-system sharing, as well as the metrics of success for such experiments, are to achieve spectrum efficiency by using the same system to address the disparate needs of federal and private users, interoperability (a priority of the public safety community that M2Z is relentlessly focused on fulfilling), high system security (an important priority for defense and homeland security users of the spectrum), rapid system deployment, IP protocol use, and a commercial system that increases competition. M2Z’s proposed system satisfies all of these criteria.

M2Z recently applied to the Commission to use fallow AWS spectrum at 2155-2175 MHz to provide a free national wireless broadband service.⁹ M2Z also plans to use the same

⁶ *Id.*

⁷ *Id.* at 5.

⁸ *Id.*

⁹ See M2Z Networks, Inc., *Application for License and Authority to Provide National Broadband Radio Service in the 2155-2175 MHz Band* (filed May 5, 2006) (“M2Z Application”). In its application, M2Z committed to: (1) provide a free nationwide broadband service; (2) construct its network so that at least 95% of the U.S.

method to provide a free national secondary data network to public safety users.¹⁰ M2Z was created, in large part, to meet our country's great and dire need for a national broadband solution that utilizes radio spectrum in an intensive and innovative manner in order to promote broadband access and facilities-based competition. As indicated in M2Z's application, its proposal will stimulate the economy, fuel global competitiveness, strengthen universal service, and promote the public interest by creating a competitive and highly affordable broadband service. Additionally, M2Z's system is designed to use spectrally efficient technologies in order to ensure that disparate groups, in particular consumers and public safety entities, can efficiently and effectively share the band. Indeed, M2Z's proposal is entirely consistent with the Commission's December 2005 Report to Congress that acknowledges the need for dual-use commercial networks that can take advantage of their economies of scale to better meet the needs of the public safety community.¹¹

The goals underlying the President's call for the test-bed coincide with the goals of M2Z. For that reason, M2Z stands ready to support this important effort by its willingness to use private sector funding to build a large, scaleable broadband network that provides public safety an affordable and interoperable broadband network. Given its dual-purpose capability, M2Z's network can also be used by a wide range of other government users such as homeland security and federal transportation that have not been heretofore addressed by commercial networks.

population can receive service within 10 years of license grant; (3) block access to indecent content for all free access service users; (4) provide public safety officials with access to an interoperable secondary data network; and (5) submit a voluntary payment to the U.S. Treasury of 5% of gross revenues generated from its subscription services. *See id.* at 4.

¹⁰ *See id.* at 24-26; Appendix 4.

¹¹ *See Report to Congress on the Study to Assess Short-Term and Long-Term Needs for Allocations of Additional Portions of the Electromagnetic Spectrum for Federal, State and Local Emergency Response Providers*, 2005 FCC Lexis 6907, *57-8 (Dec. 19, 2005) ("Report to Congress").

As the 2004 Report of the Department of Commerce has made clear, the goal of ensuring better spectrum sharing between the government and the private sector is a dual-pronged endeavor, consisting of two main categories: (1) “asymmetric” sharing – use of the same spectrum between different services provided on different systems; and (2) “same-system sharing” – use of the same *system* by different users with different needs.¹² M2Z’s dual commercial/public safety system proposal is an example of same-system sharing. M2Z’s system, however, can also accommodate a wide range of government uses beyond public safety because the system can be configured to avoid any compromise of sensitive government information.

M2Z’s proposed network can serve as a real and concrete test-bed that achieves a key component of the Commission’s and NTIA’s objectives. M2Z’s network, if deployed quickly, can demonstrate the benefits and necessary operational designs to make effective use of same-system sharing. While waiting for the expeditious grant of its application, M2Z is prepared to engage in a constructive dialogue with the Commission, NTIA and other governmental spectrum users, at the federal, state and local level, to develop operational hypotheses and requirements to be tested on its network. Such a dialogue would extend the government benefits of M2Z’s system well beyond public safety.

M2Z’s system, however, is merely part of a wide ranging inquiry and it need not be the exclusive platform for testing this type of sharing. To the extent other broadband service proponents deploy systems in other areas of the spectrum, including the Wireless Communications Service (“WCS”) band, the Broadcast Radio Service (“BRS”) band, the paired

¹² See e.g., Department of Commerce, Spectrum Policy for the 21st Century – The President’s Spectrum Policy Initiative: Report 2, at 25-26 (June 2004) (“DOC State and Local Report”) (recommending the creation of “demonstration programs to test the operational and cost effectiveness of sharing spectrum and *communications infrastructure* between federal, state and/or local governments and private users”) (emphasis added).

AWS spectrum at 1915-1920/1995-2000 (“H Block”) and 2020-2025/2175-2180 (“J Block”), the Ancillary Terrestrial Component (“ATC”) within the Mobile Satellite Service (“MSS”) band, or the 3.6 GHz band, these systems too could serve as platforms for this type of experimentation.

Given the fact that M2Z’s proposed service offering will provide a valuable platform for same-system sharing and the fact that M2Z has made unprecedented commitments in its application to further the public interest by building a very affordable broadband IP network in the 2155-2175 MHz band,¹³ M2Z believes that both common sense and equity require that 2155-2175 band not be considered for test-bed purposes until after M2Z’s license application has been duly considered and granted by the Commission.

The test-bed initiatives focusing on asymmetric sharing -- different systems on the same spectrum -- certainly need not wait for the pendency of M2Z’s application as there are other spectrum bands available that are more suitable for those considerations. These bands include the 3650-3700 MHz band, the H and J Blocks of AWS spectrum, and the unused broadcast spectrum more commonly known as “white spaces.”

II. M2Z’S SYSTEM CAN SERVE AS AN ECOSYSTEM FOR TESTING OF SAME-SYSTEM SHARING CAPABILITIES

As stated above, Commerce’s overarching goal to “explore the real-world potential of increased technical cooperation between government and industry”¹⁴ can be served in two ways - - asymmetric sharing between different services using different systems, and same-system sharing.¹⁵ M2Z’s proposed system is an ideal platform to experiment with uses that belong to

¹³ See M2Z Application at 22-26.

¹⁴ DOC State and Local Report at 23.

¹⁵ See *e.g.*, *Id.* at 25-26 (recommending the creation of “demonstration programs to test the operational and cost effectiveness of sharing spectrum and *communications infrastructure* between federal, state and/or local governments and private users”) (emphasis added).

the second category, for a simple reason: it is designed from the outset as a platform for shared use by consumers and an important contingent of government users -- the public safety community. The President's Initiative, as outlined in his 2004 Spectrum Policy Memorandum, would benefit from the ability to test this type of sharing and explore the broadening of the government uses of M2Z's proposed system beyond public safety.¹⁶ To that end, M2Z is prepared to engage in constructive dialogue with the NTIA and other representatives of the government spectrum user community to mold specific experiments on its system. M2Z is confident that such experiments would usefully evaluate the feasibility of sharing wireless systems between the private sector and federal users beyond the public safety community. To the extent that such experiments call for the exchange of sensitive information, the Commission should take appropriate precautions to safeguard proprietary information and to protect system operators and other participants from liability to third parties.

Through its application, M2Z seeks to use underdeveloped AWS spectrum at 2155-2175 MHz -- for which there are no service rules or timetable for deploying any particular type of service -- in order to provide a free national wireless broadband service. Using this same network, M2Z also plans to provide a free national secondary data network to first responders.¹⁷ In addition, M2Z's partner PacketHop will offer advanced subscription services to public safety users on M2Z's network enabling them to create infrastructureless high speed local area mesh networks. Specifically, through PacketHop's software applications, M2Z's user equipment can be transformed into a mesh network capable of operating when physical base stations are not available or as a means of extending the system's operational area. Thus, M2Z's network will

¹⁶ See Presidential Memorandum on Spectrum Policy for the 21st Century, 69 Fed. Reg. 1568 (Jan. 9, 2004) ("Presidential Memorandum").

¹⁷ See M2Z Application at 24-26; Appendix 4.

achieve *interoperability* and *survivability* -- the top priorities for public safety communications, as described by the Commission in its December 19, 2005 Report to Congress.¹⁸ Moreover, it will do so by using some of the methods noted with approval by the Commission and others -- wireless mesh networking, cognitive radios, and TDD technology.¹⁹

The system proposed by M2Z is equally capable of accommodating a wide variety of government users beyond public safety -- ranging from national and homeland security to federal transportation infrastructure and science.²⁰ The system may be reconfigured to experiment with varying operational and security needs of interested government entities. This will permit a relentless focus on one of the concerns that have been voiced by certain government users in connection with government/private system sharing -- security of sensitive information.²¹

Thus, M2Z's system can soon become a hotbed for *real-world* and *scaleable* same-system sharing, and serve as one of the practical elements of the test-bed initiative. The M2Z system squares exactly with the President's mandate to Commerce to "develop policy tools to streamline the deployment of new and expanded services and technologies, while preserving national security, homeland security, and public safety, and encouraging scientific research; and .

¹⁸ See Report to Congress at *33.

¹⁹ *Id.*, Appendix B.

²⁰ See Presidential Memorandum at 1569 (requiring Commerce to "develop means to address the critical spectrum needs of national security, homeland security, public safety, Federal transportation infrastructure, and science").

²¹ See Defense Information Systems Agency, Wireless Security Technical Implementation Guide, at 1 (Oct. 31, 2005) ("Use of wireless technologies can improve productivity of [Department of Defense ("DOD")] employees; however, wireless systems and handheld devices may also introduce security vulnerabilities, which, if left unmitigated, can expose government information systems to attack. In the last five years, there has been a dramatic evolution in wireless technologies, standards, and implementation practices. These changes impact the security of both wireless and wired networks. The pace of these changes is not expected to decrease for the foreseeable future, therefore solid security engineering practices and wireless network implementation policies are crucial to ensure that DOD wireless systems are deployed and operated in a secure manner."), available at <http://iase.disa.mil/stigs/stig/wireless-stig-v4r1.pdf>.

. . [to] develop means to address the critical spectrum needs of national security, homeland security, public safety, federal transportation infrastructure and science.”²² It can be a valuable platform for furthering a variety of recommendations included in Commerce’s report on state and local government and private entity spectrum use: that NTIA and the Commission “develop improved approaches for assessing the potential impact of emerging technologies and expanded services in a timely manner. . . . [including] the identification of . . . expanded opportunities for government/industry cooperation;”²³ and that NTIA develop “demonstration programs to test the operational and cost effectiveness of sharing spectrum and communications infrastructure between federal, state and/or local governments and private users.”²⁴ All in all, once deployed, M2Z’s system promises to be a win-win for government and private spectrum users alike.²⁵

III. THE COMMISSION HAS AT ITS DISPOSAL SEVERAL FREQUENCY BANDS THAT ARE SUITABLE FOR EXPERIMENTS THAT INVOLVE SPECTRUM SHARING AMONG DISPARATE SYSTEMS

M2Z’s proposal to use the 2155-2175 MHz band provides a concrete opportunity to enhance consumer welfare and broadband competition while demonstrating real-world spectrum sharing between commercial and governmental users. However, M2Z’s system need not be

²² Presidential Memorandum at 1569.

²³ DOC State and Local Report at 22-23.

²⁴ *Id.* at 25-26.

²⁵ M2Z notes that there very well may be other bands in which same-system sharing can be tested. For example, to the extent WCS operators deploy systems in the WCS band -- 2305-2320 and 2345-2360 MHz -- these systems too could serve as a platform for same-system spectrum sharing techniques. The WCS band was auctioned in 1997. *See Amendment of the Commission’s Rules to Establish Part 27, the Wireless Communications Service*, Report and Order, 12 FCC Rcd. 10785 (1997). M2Z notes that a number of WCS licensees filed requests to extend the deadline for complying with the substantial service requirement by three years to July 21, 2010. *See Consolidated Request for Limited Extension of Deadline for Establishing WCS Compliance with Section 27.14 Substantial Service Requirement*, WT Docket No. 06-102 (filed Mar. 22, 2006) (parties requesting the extension are AT&T, BellSouth, Comcast, NextWave Broadband, NTELOS, Sprint Nextel, Verizon, and WavTel). The WCS licensees have asserted in their requests that service has been slow to develop because of regulatory uncertainty over the operation of Digital Audio Radio Service terrestrial repeaters in adjacent bands.

alone in this effort as there are other proposed and nascent broadband networks -- including but not limited to BRS, WCS, lower 700 MHz, and MSS/ATC -- that could also be used in a similar fashion to provide the Commission and NTIA input into the test-bed initiative.

Moreover, test-bed initiatives looking into spectrum sharing for asymmetric services using different systems portend much longer germination periods because of the complexity of the inquiries that precede any test-bed results (at a minimum, one would need to establish which two types of systems need to be tested, thereby doubling the length and complexity of the inquiry itself). Given the unprecedented benefits that accrue to the public interest from M2Z's use of the 2155-2175 MHz band and holding true to the Commission's mission to encourage "affordable access to robust and reliable broadband products and services,"²⁶ M2Z urges the Commission to avoid assigning test-bed initiatives to the 2155-2175 band during the pendency of M2Z's application. Fortunately, no harm will result from making this reasoned choice as there are a number of suitable frequency bands that are excellent candidates for this kind of spectrum sharing experiment *and* do not raise similar concerns.²⁷

Additional AWS spectrum blocks and the 3650-3700 MHz band are lightly developed and would not subvert any near term spectrum sharing or broadband deployment opportunities. In addition, unused broadcast spectrum bands are also good candidates for designation as a

²⁶ See <http://www.fcc.gov/broadband>.

²⁷ The Commission should also avoid selecting spectrum in a manner that deters new entry and allows incumbents to perpetuate their current dominance of the broadband services markets. The Commission's strategic goal for broadband is that "[a]ll Americans should have *affordable* access to robust and reliable broadband products and services." See <http://www.fcc.gov/broadband> (emphasis added). Further, Section 706 of the Telecommunications Act of 1996 provides that the "Commission . . . shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans . . . by utilizing, in a manner consistent with the public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment." 47 U.S.C. § 157 nt, Pub. L. No. 104-104, § 706(a), 110 Stat. 153 (1996). Hampering new entry would be beneficial to incumbents, but would not be consistent with these mandates.

spectrum sharing test-bed. The benefits of these suggested bands for testing spectrum sharing techniques are discussed below.

A. AWS Spectrum Blocks

The paired AWS spectrum at 1915-1920/1995-2000 MHz is an excellent home for testing spectrum sharing techniques among asymmetric services. The band is relatively clear of incumbent users.²⁸ It is in the range of frequencies whose propagation characteristics lend themselves to numerous fixed and mobile uses.²⁹ Finally, as there are no immediate plans or proposals to license these AWS bands, using them as a test-bed for spectrum sharing techniques for several years would not deter any near-term opportunities to deploy broadband services or spectrum sharing projects.³⁰ Notably, this band is highly suitable for testing coexistence between large scale commercial and new technologies, including Time Division Duplex (“TDD”) and Frequency Division Duplex (“FDD”) technologies since Personal Communications Service (“PCS”) providers are operating FDD systems in an adjacent band.³¹ Similarly, the 2020-

²⁸ *Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, Sixth Report and Order, Third Memorandum Opinion and Order, and Fifth Memorandum Opinion and Order, 19 FCC Rcd. 20720, ¶ 10 (rel. Sept. 22, 2004) (“Sixth Report and Order”) (the Commission noted that “a search of [its] equipment authorization database has found no UPCS [unlicensed Personal Communications Services] equipment authorized for the 1910-1920 MHz band”).

²⁹ *See Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, First Report and Order and Third Notice of Proposed Rulemaking, 7 FCC Rcd. 6886, ¶¶ 15-17 (1992).

³⁰ The Commission has issued a Notice of Proposed Rulemaking requesting comment on possible service rules for these bands and comments have been filed, but the Commission has not yet published an order. *See Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands*, Notice of Proposed Rulemaking, 19 FCC Rcd. 19263 (rel. Sept. 24, 2004).

³¹ During the AWS proceeding, numerous PCS providers contended that intermodulation interference from H block operations could affect millions of Code Division Multiple Access (“CDMA”) users on the PCS B block, and out-of-band-emissions and overload interference could impact millions of PCS users throughout the PCS A, B, C, D, E, and F blocks. *See* Joint Comments of Sprint Corporation and Verizon Wireless, WT Docket No. 04-356 and WT Docket No. 00-353, at 7-8 (filed Dec. 8, 2004). Later in that proceeding, Sprint, Nextel and Verizon made a joint filing indicating that these problems could be alleviated. *See* Joint Reply Comments of Sprint Corporation, Verizon Wireless and Nextel Communications, WT Docket No. 04-356 and WT Docket No. 00-353, at 2 (filed Feb.

2025/2175-2180 MHz block spectrum, which is adjacent to the S band MSS/ATC spectrum, would be an ideal band for testing cooperative sharing of terrestrial systems through cognitive radio technologies and dynamic frequency selection (“DFS”) technologies operating in these bands.

B. 3650-3700 MHz Band

The 3650-3700 MHz band would also be a suitable location for such experiments. This spectrum is subject to non-exclusive nationwide licensing and is allocated to fixed and mobile services.³² The minimal and streamlined licensing rules established for this band are designed to encourage multiple entrants and to stimulate the rapid expansion of broadband Internet providers.³³ Thus, the regulations already allow for rapid implementation and productive use of the spectrum test-bed for the purpose of exploring asymmetric sharing.³⁴

C. Unused Broadcast Spectrum

Unused television spectrum below 1 GHz -- the so-called white spaces -- would also be well suited for use as a test-bed for spectrum sharing techniques. Congress is cognizant that broadcast spectrum is lying, and will continue to lie, fallow.³⁵ Lying below 1 GHz, this spectrum

8, 2005). Thus, this band is ripe for these types of experiments to examine the extent to which the hypothesized initial concerns are warranted.

³² See *Wireless Operations in the 3650-3700 MHz Band*, Report and Order and Memorandum Opinion and Order, 20 FCC Rcd. 6502 (2005). Government operation radios are protected in the 3650-3700 MHz band. As such, the band provides an opportunity to evaluate government and private spectrum sharing as contemplated in the test-bed Public Notice.

³³ See *id.* at ¶ 1.

³⁴ See Public Notice at 4 (the Commission asks if it should conduct a rulemaking to specifically authorize various uses and frequency bands or use the experimental licensing program to implement the spectrum sharing test bed). Given that the report from the Commission and NTIA on the test-bed is due in June 2008, it is difficult to see how conducting a rulemaking would allow sufficient time to actually conduct experiments in the spectrum sharing test-bed. Using spectrum like the 3650-3700 MHz band is another way, in addition to experimental licenses, to move the spectrum sharing test-bed forward quickly.

³⁵ See, e.g., S.2332 - American Broadband for Communities Act (introduced Feb. 17, 2006) (proposes using unused television spectrum in the band between 72 and 698 MHz for unlicensed devices including wireless

has excellent propagation characteristics. In addition, establishing a spectrum sharing test-bed in unused television spectrum is unlikely to block the provision of any planned broadband service or efforts to implement real world spectrum sharing.³⁶

IV. CONCLUSION

M2Z's proposed system can serve as a vibrant ecosystem of technologies that can provide a valuable platform to the Commission and NTIA to test how advanced technologies can be used to achieve seamless and secure same-system sharing among government and private/commercial users. M2Z urges the Commission and NTIA to consider its proposal for a nationwide broadband wireless service as a critical component of its test-bed initiative. During the pendency of M2Z's application, the Commission should avoid considering the 2155-2175 MHz band for test-bed exercises as there are other frequency bands that are more suitable.

Respectfully submitted,

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broadband devices), H.R.5085 (introduced April 4, 2006) (the House version of the "American Broadband for Communities Act").

³⁶ To the best of M2Z's knowledge, there are no imminently planned services in the unused television spectrum. The Commission opened a rulemaking on using this spectrum for unlicensed devices in 2004 but that proceeding is still pending. See *In the Matter of Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Notice of Proposed Rulemaking, 19 FCC Rcd. 10018 (2004).